JAN 4 2008

LIMITED PHASE TWO

ENVIRONMENTAL SITE ASSESSMENT

PROPOSED DREDGE PROJECT AREA
PETERKIN FACILITY
HARRIS COUNTY, TEXAS

PREPARED FOR
GOLDSTON ENGINEERING, INC.

BY
BERG-OLIVER ASSOCIATES, INC.
HOUSTON, TEXAS
REPORT NO: 6579YPT07
DECEMBER 2007

90028226

BERG ♦ OLIVER ASSOCIATES, INC.
Environmental Science, Engineering & Land Use Consultants
14701 St. Mary's Lane, Suite 400
Houston, Texas 77079
(281) 589-0898 fax: (281) 589-0007

December 07, 2007

Mr. William Goldston P. E.
Goldston Engineering, Inc.
5850 San Felipe, Suite 650
Houston, Texas 77057

Dear Mr. Goldston,

Berg-Oliver and Associates, Inc. (BOA) is pleased to present this report summarizing our findings and conclusions from a Limited Phase II Environmental Site Investigation performed at the subject site in Channelview, Harris County, Texas. This project area is a proposed dredge site for the Kirby Inland Marine Peterkin facility, and is located within Old River. The project area is additionally shown on site renderings included in the appendices section of this report.

EXECUTIVE SUMMARY

SITE HISTORY

The project area lies within a portion of Old River deemed by EPA and TCEQ as potentially containing elevated levels of poly-chlorinated dibenzo-p-dioxins and furans (PCDD/PCDF). Dredging in the project area requires a permit from the United States Army corps of Engineers (the Corps). A dredge permit was initially submitted to the Corps during the 2nd quarter of 2006 (Permit Application No. 24218). During the comment period for the proposed permit, Texas Parks and Wildlife Department (TPWD) raised concerns about potential dioxin concentrations in site sediments and the potential for downstream impacts from potentially affected sediments disturbed during construction activities. Kirby was unable to obtain information needed to respond to TPWD concerns within the short time period allowed by the Corps, and the permit was not issued. The current investigation was performed to assess potential dioxin and furan concentrations within the

project area prior to resubmission of the permit to the Corps.

PHASE II INVESTIGATION

BOA's scope of work included installation of four (4) borings within the project area. Borings were advanced to depths of approximately ten (10) to twelve (12) feet below the river bottom, as this is the approximate average depth of excavation for the proposed dredge. The data received during this investigation were compared to the Texas Commission on Environmental Quality (TCEQ) Texas Risk Reduction Program (TRRP) Protective Concentration Levels (PCL's).

Borings were advanced and samples collected using a boat-mounted jackhammer sampler on August 27, 2007. Borings were advanced by Alpine Field Services, Inc. under the direction of Mr. Chris Thayer of BOA. The borings were advanced by initially installing PVC riser to the total depth of the boring. The borings were then pumped dry prior to collection of soil samples with the jackhammer rig. Boring locations are indicated on the site map included in the appendices of this report.

One (1) composite sediment soil sample was collected from the entire soil column at each boring location, as a composite sample is most representative of the sediments to be disturbed and/or relocated during construction activities. Sediment samples were submitted for analysis of PCDD and PCDF by SW-846 Method 8290.

ANALYTICAL RESULTS AND DISCUSSION OF FINDINGS

Laboratory analytical results are included in the appendices of this report. Analytical results indicate that the Toxicity Equivalency Factor (TEF) corrected results for sediment samples B-1 through B-4 are below the Tier 1 Sediment Protective Concentration Level (PCL) for 2,3,7,8-TCDD of 0.001 mg/kg.

Of the various PCDD/PCDF isomers, 2,3,7,8 TCDD is considered the most toxic. For purposes of evaluating potential impacts from PCDD and PCDF, TEFs are used to calculate results for individual PCDD/PCDF isomers "as if" they were 2,3,7,8-TCDD. This then allows comparison of all of the individual isomers to the PCL for 2,3,7,8-TCDD. Sample results received from the laboratory were calculated using TEFs contained in the 1989 EPA ROD. Sample results were re-calculated by BOA using TEFs included in TCEQ TRRP. Whether using TEFs from the 1989 EPA ROD or TRRP, the resulting TEF results for all sediment samples are below the TRRP Tier 1 Sediment PCL of 0.001 mg/kg for 2,3,7,8-TCDD. The highest 2,3,7,8-TCDD TEF reported for the samples is 0.000004 mg/kg for sample B-2, two orders of magnitude below the TRRP Tier 1 PCL.

CONCLUSIONS AND RECOMMENDATIONS:

Based upon the results received during the course of this Limited Phase II Site Investigation, sediments within the proposed project area contain PCDD/PCDF TEF equivalencies 2 to 3 orders of magnitude below the TRRP Tier 1 Sediment PCL for 2,3,7,8-TCDD. Additionally, excavation activities will utilize a clamshell excavator, which will minimize sediment dispersal. It appears dredging of the project area can be conducted without detrimental impacts., and no further action appears warranted at this time.

Based upon conversations with the client, it is possible that the dredge material placement location may change. Previous data was collected by PSI during a 2006 assessment of the subject site. One (1) composite sediment sample was collected from the proposed Peterkin dredge area. This sample was analyzed for VOA, SVOA, PCB, Priority Pollutant Metals, organo-chlorine pesticides, and TPH. Analytical results from the PSI investigation indicate potential COC concentrations are at or below TRRP Tier 1 Residential Soil PCL's and/or the Texas Specific Background Concentration (for metals) for sample B-11. Based upon the results received during the PSI investigation, the sediments meet TRRP Residential soil re-use criteria as defined in 30 TAC 350.36. There appears to be no reason the permit application can not be amended to include placement of dredge spoils on property owned by the applicant. Since the material meets Tier 1 Residential soil PCL's, there appears to be no need for impervious cover or other institutional controls.

INTRODUCTION

The Limited Phase II Environmental Site Investigation was performed at the client's request based upon responses received from TPWD to a Corps permit request submitted by client.

Berg-Oliver Associates, Inc.'s scope of work included the following tasks:

Task 1: Review previous EPA and TCEQ on PCDD/PCDF data collected in the general vicinity of the project area and other previous Phase II investigations of the site.

Task 2: Install sediment borings as indicated on the site map included in the appendices of this report. Collect a composite sediment sample from each boring location and provide appropriate analytical analyses and data for each sample.

Task 3: Compare data to Texas Commission on Environmental Quality (TCEQ) Texas Risk Reduction Program (TRRP) Protective Concentration Levels (PCLs).

Task 4: Compile site activities and analytical results into a Limited Phase II Site Investigation Report of findings.

SITE HISTORY

The project area lies within a portion of Old River deemed by EPA and TCEQ as potentially containing elevated levels of poly-chlorinated dibenzo-p-dioxins and furans (PCDD/PCDF). Dredging in the project area requires a permit from the United States Army corps of Engineers (the Corps). A dredge permit was initially submitted to the Corps during the 2nd quarter of 2006 (Permit Application No. 24218). During the comment period for the proposed permit, Texas Parks and Wildlife Department (TPWD) raised concerns about potential dioxin concentrations in site sediments and the potential for downstream impacts from potentially affected sediments disturbed during construction activities. Kirby was unable to obtain information needed to respond to TPWD concerns within the short time period allowed by the Corps, and the permit was not issued. The current investigation was performed to assess potential dioxin and furan concentrations within the project area prior to resubmission of the permit to the Corps.

PHASE II INVESTIGATION

BOA's scope of work included installation of four (4) borings within the project area. Borings were advanced to depths of approximately ten (10) to twelve (12) feet below the river bottom, as this is the approximate average depth of excavation for the proposed dredge. The data received during this investigation were compared to the Texas Commission on Environmental Quality (TCEQ) Texas Risk Reduction Program (TRRP) Protective Concentration Levels (PCL's).

Borings were advanced and samples collected using a boat-mounted jackhammer sampler on August 27, 2007. Borings were advanced by Alpine Field Services, Inc. under the direction of Mr. Chris Thayer of BOA. The borings were advanced by initially installing PVC riser to the total depth of the boring. The borings were then pumped dry prior to collection of soil samples with the jackhammer rig. Boring locations are indicated on the site map included in the appendices of this report.

One (1) composite sediment soil sample was collected from the entire soil column at each boring location, as a composite sample is most representative of the sediments to be disturbed and/or relocated during construction activities. Sediment samples were submitted for analysis of PCDD and PCDF by SW-846 Method 8290.

B-1: Boring B-1 was completed to a total depth of twelve feet (12') below the river bottom in the location indicated on the site map included in the appendices of this report. A composite sediment sample was collected from zero (0) to twelve (12) feet and submitted for analysis of PCDD/PCDF by SW-846 Method 8290.

B-2: Boring B-2 was completed to a total depth of ten feet (10') below the river bottom in the location indicated on the site map included in the appendices of this report. A composite sediment sample was collected from zero (0) to twelve (10) feet and submitted for analysis of PCDD/PCDF by SW-846 Method 8290.

B-3: Boring B-3 was completed to a total depth of twelve feet (12') below the river bottom in the location indicated on the site map included in the appendices of this report. A composite sediment sample was collected from zero (0) to twelve (12) feet and submitted for analysis of PCDD/PCDF by SW-846 Method 8290.

B-4: Boring B-4 was completed to a total depth of twelve feet (12') below the river bottom in the location indicated on the site map included in the appendices of this report. A composite sediment sample was collected from zero (0) to twelve (12) feet and submitted for analysis of PCDD/PCDF by SW-846 Method 8290.

All soil samples secured on site were preserved on ice. Ice is used to keep samples cool so that any volatile or semi-volatile compounds will not vaporize during collection and shipment to the laboratory. Groundwater samples were preserved as appropriate for the chosen method(s) of analysis.

Appropriate sample collection methods were used during field sampling activities including, but not limited to, secure sample containers, and the use of sterile latex gloves to prevent cross-

contamination of samples.

ANALYTICAL ASSESSMENT AND METHODOLOGY

Samples were delivered on the indicated dates to Columbia Environmental Services (CAS). CAS uses analytical test procedures and quality assurance procedures established and monitored by the Environmental Protection Agency (EPA). The following are the analytical tests selected for this investigation.

Poly-chlorinated dibenzo-p-dioxins and furans (PCDD/PCDF) by SW-846 8290: This laboratory analysis employs a GC equipped with a High Resolution Mass Spectrometer (High Res MS) detector to detect and quantify PCDD/PCDF isomers in a soil, sediment, or water sample. The sample is subject to solvent extraction and then analyzed using a High Res MS that detects and quantifies individual isomers from the tetra (TCDD/TCDF) to octa (OCDD/OCDF) range. Use of a High Res MS allows extremely low reporting limits, in the parts per trillion (ppt) range or below. For assessment purposes, TEFs are used to convert the individual isomers "as if" they were 2,3,7,8-TCDD, as this isomer is considered the most toxic of the PCDD/PCDF isomers.

REGULATORY FRAMEWORK

The guidelines listed below are derived from data published by TCEQ.

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ)

The Texas Commission on Environmental Quality administers the Environmental Protection Agency (EPA) regulations and enforcement in Texas. It has additionally established its own standards for environmental compliance. The Texas Risk Reduction Program (TRRP) administered by TCEQ, as provided for in 30 TAC Chapter 350, addresses levels of regulated compounds and allowable levels of such contaminants to protect human health, safety, and the environment. The TCEQ TRRP applies to closures, corrective actions, and remediation efforts subject to the jurisdiction of the TCEQ. The TRRP, whether residential or commercial, contains provisions for Remedy Standard A (no physical controls required) or Remedy Standard B (physical controls required). Implementation of Remedy Standard A or Remedy Standard B is a tiered process, as described in general terms below:

Tier 1 is a risk-based analysis to derive non-site-specific PCLs for complete or reasonably anticipated to be complete exposure pathways. Tier 1 is based on default exposure factors and affected property parameters, and assumes exposure occurs at, above, or below the source area (i.e., no lateral transport) (TCEQ Subchapter D Section 350.75 (b)).

Tier 2 is a risk-based analysis to derive site-specific PCLs for complete or reasonably anticipated to be completed exposure pathways utilizing site-specific exposure factors, as allowable, and/or affected property parameters and Tier 1 equations. Tier 2 PCLs may also include lateral transport considerations (TCEQ, Subchapter D Section 350.75 (c)).

Tier 3 is a risk-based analysis to derive site-specific PCLs for complete or reasonably anticipated to be completed exposure pathways. Tier 3 PCLs are based on measured natural attenuation factors and/or natural attenuation factor models/equations other than those provided for Tier 1 or 2; and may also include site-specific exposure factors, as allowable, and/or affected property parameters (TCEQ, Subchapter D Section 350.75 (d)).

The PCLs are concentrations which are protective of human health and the environment.

*	$^{GW}Soil$	*	Groundwater protection standard for either residential or commercial use. Concentration in soil assumed protective of groundwater considering cross-medial contamination of groundwater from contaminated soil.
*	$^{GW}GW_{Ing}$	*	Groundwater standard for either residential or commercial land use, based on primary MCls where available.
*	$^{Tot}Soil_{Comb}$	*	The combined exposure standard for residential use. Considers cross-media contamination of air and human ingestion and inhalation pathway.

The TCEQ TRRP does contain some published standards for TPH in soils and groundwater. TPH concentrations are compared to Tier I PCls based upon the concentrations of aliphatic and/or aromatic hydrocarbons present in the carbon range from C6 to C35.

ANALYTICAL RESULTS AND DISCUSSION OF FINDINGS

Laboratory analytical results are included in the appendices of this report. Analytical results indicate that the Toxicity Equivalency Factor (TEF) corrected results for sediment samples B-1 through B-4 are below the Tier 1 Sediment Protective Concentration Level (PCL) for 2,3,7,8-TCDD.

Of the various PCDD/PCDF isomers, 2,3,7,8 TCDD is considered the most toxic. For purposes of evaluating potential impacts from PCDD and PCDF, TEFs are used to calculate results for individual PCDD/PCDF isomers "as if" they were 2,3,7,8-TCDD. This then allows comparison of all of the individual isomers to the PCL for 2,3,7,8-TCDD. Sample results received from the

laboratory were calculated using TEFs contained in the 1989 EPA ROD. Sample results were re-calculated by BOA using TEFs included in TCEQ TRRP. Whether using TEFs from the 1989 EPA ROD or TRRP, the resulting TEF results for all sediment samples are below the TRRP Tier 1 Sediment PCL of 0.001 mg/kg for 2,3,7,8-TCDD. The highest 2,3,7,8-TCDD TEF reported for the samples is 0.000004 mg/kg for sample B-2, two orders of magnitude below the TRRP Tier 1 PCL.

CONCLUSIONS AND RECOMMENDATIIONS:

Based upon the results received during the course of this Limited Phase II Site Investigation, sediments within the proposed project area contain PCDD/PCDF TEF equivalencies 2 to 3 orders of magnitude below the TRRP Tier 1 Sediment PCL for 2,3,7,8-TCDD. Additionally, excavation activities will utilize a clamshell excavator, which will minimize sediment dispersal. It appears dredging of the project area can be conducted without detrimental impacts., and no further action appears warranted at this time.

Based upon conversations with the client, it is possible that the dredge material placement location may change. Previous data was collected by PSI during a 2006 assessment of the subject site. One (1) composite sediment sample was collected from the proposed Peterkin dredge area. This sample was analyzed for VOA, SVOA, PCB, Priority Pollutant Metals, organo-chlorine pesticides, and TPH. Analytical results from the PSI investigation indicate potential COC concentrations are at or below TRRP Tier 1 Residential Soil PCL's and/or the Texas Specific Background Concentration (for metals) for sample B-11. Based upon the results received during the PSI investigation, the sediments meet TRRP Residential soil re-use criteria as defined in 30 TAC 350.36. There appears to be no reason the permit application can not be amended to include placement of dredge spoils on property owned by the applicant. Since the material meets Tier 1 Residential soil PCL's, there appears to be no need for impervious cover or other institutional controls.

Chris Thayer, REM
Project Manager

for
Ben Price, REM
Vice-President